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RESEARCH

Dimensions of Secularity (DoS): An Open Inventory to Measure Facets of Secular Identities

Tatjana Schnell 

Institute of Psychology
University of Innsbruck, Austria

Beliefs about the world affect experiences and behavior. Although much is known about beliefs pertaining to religion, or the supernatural, secular identities have, to date, remained largely neglected. To allow for dimensional assessment of different aspects of secular identities, the Dimensions of Secularity (DoS) inventory has been developed. It measures degrees of atheism, agnosticism and several philosophic orientations (scientism, personal responsibility, humanism). As an “open” inventory, these constructs are not seen as comprehensive, and researchers are encouraged to add further scales. The DoS shows good reliabilities and a clear factor structure. Confirmatory factor analysis confirms the theoretically proposed model. Correlation patterns with discriminant measures (religious belonging, belief, spirituality, numinous experiences) support the instrument’s discriminant validity. Associations with sources of meaning contribute to construct validity. Demographic relationships are reported and discussed.

INTRODUCTION

Basic assumptions and beliefs about the world affect experiences and behavior (e.g., Janoff-Bulman, 1992; Lerner, 1980; Michel, Pace, Edun, Sawhney, & Thomas, 2014; Paulhus & Carey, 2011). So do ideas about what is “beyond this world,” as we know from a strong body of research on religiosity and spirituality (cf. Hood, Hill, & Spilka, 2009; Paloutzian & Park, 2013; Wulff, 1997). Rather surprisingly, research has predominantly dealt with viewpoints that assume that there *is* something beyond, a god, gods, or a supernatural power. It is not evident,

Correspondence should be sent to Tatjana Schnell, University of Innsbruck, Innrain 52, 6020 Innsbruck, Austria.
E-mail: tatjana.schnell@uibk.ac.at

however, why a nonbelief in the supernatural should be of less interest with regard to its consequences for experiences and behavior. Especially with the emergence of “new atheism” and the salience of debates surrounding the concept of secularization, it is timely to explore beliefs and attitudes held by this so far underresearched group of people and integrate them into a larger understanding of secular identities. The term “secular,” in this context, is understood as “denoting attitudes, activities, or other things that have no religious or spiritual basis” (“Secular,” 2014). “Secular identity” has been defined as “a set of beliefs about freedom of religion for the individual in a modern, national state” (Maroney, 2010, p. 663). In the present context, however, it refers not only to beliefs about freedom of religion but, more generally, to basic assumptions about the world that are not based on religion or spirituality.

Although a minority in most populations, the number of individuals who actively dissociate themselves from religion seems to be rising. In the United States, as reported by WIN-Gallup International (2012), religiosity—that is, the self-description as “a religious person” in the question “Irrespective of whether you attend a place of worship or not, would you say you are a religious person, not a religious person or a convinced atheist?”—has decreased from 73% (2005) to 60% (2012), and atheism increased from 1% (2005) to 5% (2012). With an estimated 500 to 900 million unbelievers worldwide (Barrett, Kurian, & Johnson, 2001; Zuckerman, 2007), secularity should be considered “an important and widespread social phenomenon in its own right” (Bullivant, 2008, p. 363). As such, it demands recognition and respect in contexts such as counseling (D’Andrea & Sprenger, 2007), school curricula (Anderson, 2004; Knauth et al., 2008), workplace diversity (Estlund, 2003), or civic policies (Williams, 2014). To adequately meet requests for acknowledgment and inclusion, a lot more needs to be known about the characteristics of those concerned.

SOCIAL-SCIENTIFIC INVESTIGATION OF SECULARITY

Considering the whole range of possible stances towards the existence of a transcendent reality—ranging from atheism via indifference and agnosticism to different degrees of religiosity (cf. the continuum of vertical transcendence; Schnell & Keenan, 2011)—there are all too many blank spots on our map of worldviews (Hutsebaut & Corveleyn, 1994; Hwang, Hammer, & Cragun, 2011; Schnell & Keenan, 2011). From the few empirical studies that explicitly addressed secularity, or atheism, some first findings can be summarized. Jörns (1997) found German atheists to “believe” in humanism and trust in technical innovation; they held a positivistic epistemology and found life meaning through work. Hunsberger and Altemeyer (2006) portrayed members of atheist clubs in the United States as moderately zealous but rather dogmatic and religiously ethnocentric in their beliefs. Drawing on a large sample of Americans who self-described as not believing “in any sort of God, gods, or Higher Power,” Baker and Robbins (2012, p. 1079) found two psychological types to be predominant among nonbelievers: Both stand for a preference of introversion, thinking, and judging. Burris and Petrican (2011) and Burris and Redden (2012) published experimental support for the hypothesis that atheists process emotions differently from religious individuals; the former appear to have greater difficulty to generate emotionally evocative internal simulations. With regard to mental health, Buggle, Bister, and Nohe (2000) found depression scores to be lowest for pious Christians, followed by convinced atheists, whereas moderate believers were most likely to be depressed.

The result was replicated several times (e.g., Galen & Kloet, 2011; Mochon, Norton, & Ariely, 2011; Riley, Best, & Charlton, 2005). Pertaining to well-being, Altemeyer (2009) reported lower degrees of happiness among secular than among religious people. Schnell and Keenan (2011) conveyed a similar result in connection with meaning in life: In their study, self-declared atheists experienced lower levels of meaningfulness than both religionists and “nones” (not religiously affiliated).

The latter study (Schnell & Keenan, 2011), however, went further by employing a more differentiated approach. Self-declared atheism was not viewed as a homogeneous concept. Instead, based on findings from large-scale surveys, systematic internal variation was assumed. The data corroborated the assumption. Three independent meaning subsystems were identified: The “low-commitment” type was characterized by generally low commitment, low meaningfulness, and a high frequency of crises of meaning. “Broad-commitment” atheists exhibited considerably higher levels of meaningfulness and rare crises of meaning. They evidenced, in particular, a high commitment to *well-being and relatedness*. The third type, primarily committed to *selfactualization*, exhibited moderate levels of meaningfulness, with crises of meaning being literally absent.

Shared disbelief, as illustrated by the results, does not imply mutual commitments. Not surprisingly, one might add. Although largely neglected, so far, heterogeneity within secular belief systems should be expected, and explored appropriately (Hwang, Hammer, & Cragun, 2011; Schnell & Keenan, 2011; Williams, 2014). With Dimensions of Secularity (DoS), an inventory is provided that allows for the measurement of a variety of conceptions linked with secularity. It uses a dimensional approach, thus implying the following: Secular identities can be characterized by various aspects. Because there is not one prototype of secularity but many possible manifestations, all of these dimensions *can* be present in a secular identity but do not have to. These aspects are not construed as either/or categories, as has largely been done so far. An individual is *not* either an atheist or not an atheist, but can be committed to atheism (and all other aspects) *to more or less marked degrees*. Like that, orientations linked to secular identities are construed in the same way as attitudes typically are in social scientific research: as continua of more or less agreement/commitment. Consequently, every individual—from self-described religionists to atheists—can be characterized by a specific profile of secularity.

WHAT ARE SECULAR IDENTITIES MADE OF?

So far, “secular” is only negatively defined, referring to basic assumptions about the world that are not based on religion or spirituality. To identify “positive” facets of secular identities, a review of several sources has been carried out. They covered definitions of atheism, agnosticism, and secularity in philosophical and theological dictionaries; empirical studies on atheism, agnosticism, and secularity; and self-descriptions of atheist, agnostic, humanist, freethinking, or other secular groups on the Internet. This search is not viewed as comprehensive and researchers are invited to add further facets that are not being covered here.

The following aspects are considered for differentiating and measuring secular identities:

Attitudes toward deity

- Atheism
- Agnosticism

Philosophical orientations

- Scientism
- Personal responsibility
- Humanism

Attitudes Toward Deity

A secular identity can, first, be linked to a specific attitude toward deity. For several centuries, two such attitudes have been distinguished: *atheism* and *agnosticism*. Atheism, according to an established German philosophical dictionary (Gessmann & Schmidt, 2009), is the denial of the existence of one or more gods, or the divine. Blackburn (2008), in the *Oxford Dictionary of Philosophy*, defined “atheism” as “either the lack of belief that there exists a god, or the belief that there exists none” (p. 27). *Agnosticism*, derived from the Greek *agnosia*—lack of knowledge—denotes the view that the metaphysical question of god is unanswerable (Blackburn, 2008; Gessmann & Schmidt, 2009).

Philosophical Orientations

Apart from a specific stand with regard to the existence of deity, secular identities are often associated with particular philosophical orientations.

Atheists and freethinkers are known to show a high trust in science and scientific/technical innovation (cf. Eagleton, 2009; Jörns, 1997; Nagel, 2010). *Scientism*—defined as an “attitude that regards science as the ultimate standard and arbiter of all interesting questions; or alternatively that seeks to expand the very definition and scope of science to encompass all aspects of human knowledge and understanding” (Pigliucci, 2013, p. 144)—can thus be understood as a dimension of secular identities (e.g., British Humanist Association, 2014; Pigliucci, 2013).

Personal responsibility is another orientation linked to secular identities. When ideas such as a divine plan or divine intervention are dismissed, every individual is personally responsible for her or his own life, as held by existentialists like Sartre (1943/1992) as well as contemporary atheists (e.g., American Atheists, 2014; Flynn, 2013; International Humanist and Ethical Union, n.d.-a, n.d.-b).

Atheist or secular organizations frequently use the term ‘humanist’ for self-description (e.g., International Humanist and Ethical Union, Council for Secular Humanism, British Humanist Association). The term *humanism* refers to “any philosophy concerned to emphasize human welfare and dignity” (Blackburn, 2008, p. 171). Such an attitude can, of course, be based on a religious or a secular world-view (Flynn, 2013). When associated with atheism, or secularity, the term *humanism* takes on an array of meanings, as, for example, in the definition from the American Humanist Association (2014, para. 1): “Humanism is a progressive life stance that, without supernaturalism, affirms our ability and responsibility to lead meaningful, ethical lives capable of adding to the greater good of humanism.” Apart from the aspects already mentioned earlier, the particular humanist element, here, is an ethical, value-based approach to life and society. As such, it is not to be equated with, or inherent to, “simple atheism,” which is “only a position on the existence of God, not a comprehensive life stance” (Flynn, 2013).

For the construction of the DoS inventory, the ethical, value-based approach to life and society is included.

In the following pilot study, the development of a dimensional psychometric inventory to measure the aforementioned dimensions is described. Reliabilities, factor structure, and first evidence for validity are reported.

STUDY 1: DEVELOPMENT OF THE DoS INVENTORY

In a first step, a team of five theoretically and methodologically trained collaborators developed items (in German language) for all theoretically posited dimensions. The resulting 34 items were then rated by all with regard to their (a) comprehensibility and (b) relevance for the construct in question. Based on these ratings, the best five to six (when scores were equal) items per scale were chosen ($N = 26$ items). Item properties, reliabilities, factor structure, and discriminant validity were explored.

Method

Procedure and Participants

Via a university-wide mailing list, students and colleagues were invited to participate in the study. The questionnaire was administered online. There were no incentives, but psychology students received course credits for participating. Altogether, 519 German-speaking college students, graduates, and university employees, from all disciplines and levels, fully completed the test. After eliminating cases with incorrectly answered control items as well as multivariate outliers, 412 participants remained. Their age ranged from 18 to 71 years ($M = 27$, $SD = 9$); 68% were female. Seventy-seven percent came from the social sciences or humanities, and 23% from natural sciences. Of all participants, 17% self-described as “religious person,” 29% as “spiritual person,” 33% as “agnostic,” 15% as “atheist,” and 6% as “indifferent.” Sixty-seven percent were Austrian, 22% German, and 11% Italian.

Measures

The five DoS dimensions were operationalized by the following statements (English items have not been validated, yet, and are therefore not printed here):

Atheism: Nonbelief in god/a higher power; nonbelief in a divine plan; god/higher powers are wishful thinking; world not created by god/higher power; god created by mankind.

Agnosticism: God/higher power might exist, but will never know; question of god/higher powers always unanswerable; human thought too limited to know about god/higher power; impossible to resolve the question of god/higher powers.

Scientism: Trust in science and technology to solve problems of mankind; science offers solutions for all problems; in the end everything explainable by natural sciences; natural sciences and technology motor for successful human development.

Personal responsibility: Everybody responsible for their own life; my life meaning depends on me; fate in our own hands; only I responsible for my deeds and omissions; my life course down to me.

Humanism: I approach others with benevolence and kindness; would accept constrictions in standard of living to alleviate others' suffering; tolerance one of most important maxims; duty to support people in need for help.

Agreement with all statements is rated on a 6-point response scale from 0 (*do not agree at all*) to 5 (*agree completely*).

Apart from the DoS, one-item measures of religious belonging, religious belief, and spirituality were administered. They read as follows:

- *Are you an official member of a religious community? If so, how strong is your sense of belonging to this religious community?* (0–5)
- *According to your personal definition of religiosity, how religious would you say you are?* (0–5)
- *How spiritual would you say you are? (Spirituality defined as: belief in a supernatural power)* (0–5)

In addition, a scale measuring numinous experiences was included. It comprises five items, tapping experiences like the presence of a spiritual power, a sixth sense, telepathy, and extrasensory connection. The scale has a good internal consistency of Cronbach's $\alpha = .82$.

Hypotheses

Atheism, agnosticism, and scientism were expected to show substantial negative relationships with religious belonging, religious belief, spirituality, and numinous experiences (discriminant validity). Because atheism explicitly denies the existence of god(s) or the divine, whereas agnosticism refrains from a decision, negative correlations should be stronger for atheism than for agnosticism.

Recent studies have suggested that atheism and agnosticism do not necessarily exclude the presence of irrational beliefs (e.g., Rimmel, 2014; Schnell & Keenan, 2013) but rather are directed against institutionalized and dogmatic religion and spirituality. Therefore, the numinous experiences scale was expected to show weaker relationships with atheism, agnosticism, and scientism than items measuring religiosity and spirituality.

Gender appears to be strongly related to religious or secular beliefs. According to Francis (1997), "Statistical evidence seems unequivocal that women are more religious than men" (p. 81). Self-identification as atheist or agnostic, on the other hand, has been shown to be more frequent for men (Hunsberger & Altemeyer, 2006; Zuckerman, 2007). In line with these findings, men were assumed to report higher values in atheism, agnosticism, and scientism than women. Finally, the DoS scales were expected to differ substantially between the five categories of self-description—religious, spiritual, atheist, agnostic, and indifferent (criterion validity).

TABLE 1
Descriptive Statistics for Dimensions of Secularity Scales

<i>Scale</i>	<i>M</i>	<i>SD</i>	<i>Md</i>	<i>No Items</i>	<i>Cronbach's alpha</i>	<i>Skewness^a</i>	<i>Kurtosis</i>
Atheism	3.01	1.50	3.20	5	.92	-0.39	-0.93
Agnosticism	3.50	1.26	3.80	5	.84	-1.01	0.51
Scientism	2.17	1.04	2.25	4	.74	0.27	-0.39
Personal responsibility	2.85	0.93	2.75	4	.61	-0.21	-0.07
Humanism	4.24	0.62	4.25	4	.69	-0.89	0.50

Note. Response range is 0 to 5. $N = 412$.

^aValues in italics are moderately skewed; therefore, also Median values (*Md*) are given.

Results

In accord with the rational method of scale construction (Burisch, 1984), item analysis was carried out to select the best items. All items with item-total-correlation below .30 were removed. Reliabilities of the optimized scales were adequate to good (see Table 1). For the majority of items, difficulties were in the medium range ($1.6 > M < 3.9$; range = 0–5). Humanism items exhibited high mean values (up to $M = 4.4$) and lower standard deviations (down to $SD = 0.75$) than items from other scales, thus indicating the necessity of revision in the next version. Both agnosticism and humanism were negatively skewed. To approach normal distribution, agnosticism was log-transformed and humanism inverted.

Scale Intercorrelation and Factor Structure

Table 2 shows intercorrelations of all DoS scales. All relationships were small to moderate. Atheism was positively correlated with agnosticism and scientism. To a lesser degree, humanism was negatively related to scientism and personal responsibility.

To examine the internal structure of the DoS, an exploratory principal axis analysis with oblique rotation was carried out (SPSS 21). All five rationally construed scales were clearly replicated. Five factors had Eigenvalues > 1 ; the Scree test also indicated a five-factor solution ($4.75 - 2.43 - 2.21 - 1.84 - 1.71 - 1.05$). Altogether, 50% of variance was explained. Table 3 shows factor loadings.

TABLE 2
Intercorrelation of Dimensions of Secularity Scales

	<i>Atheism</i>	<i>Agnosticism</i>	<i>Scientism</i>	<i>Humanism</i>
Agnosticism ^a	.27***			
Scientism	.25***	.00		
Humanism ^a	-.07	.01	-.13**	
Personal responsibility	.08	.10*	.03	-.11*

Note. $N = 412$.

^aTransformed.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (two-sided).

TABLE 3
Exploratory Principal Axis Analysis with Oblique Rotation, Pattern Matrix

	1	2	3	4	5
Atheism	.90				
Atheism	.90				
Atheism	.81				
Atheism	.76				
Atheism	.75				
Agnosticism		.79			
Agnosticism	.30	.78			
Agnosticism		.67			
Agnosticism		.60			
Humanism			.66		
Humanism			.62		
Humanism			.58		
Humanism			.56		
Scientism				.82	
Scientism				.69	
Scientism				.65	
Scientism				.43	
Personal responsibility					.74
Personal responsibility					.59
Personal responsibility					.45
Personal responsibility					.37

Note. Loading < .30 not shown.
N = 412.

Apart from atheism and agnosticism that shared one double loading, factors were clearly separated. Factor loadings for scientism, humanism, and personal responsibility were relatively low, suggesting some item revision. According to the Kaiser-Meyer-Olkin criterion, the data set was not suited for secondary factor analysis (KMO = .53).

Discriminant Validity

Atheism, agnosticism, and scientism were expected to correlate negatively with religious belief and belonging, spirituality, and numinous experiences. Table 4 illustrates relationships between all measures. In line with the hypotheses, atheism and scientism correlated negatively with all discriminant measures. As expected, effects were stronger for atheism than for agnosticism: The latter (only) exhibited a moderate negative relationship with religious belonging and small negative relationships with religious belief and spirituality. However, agnosticism did not correlate negatively with numinous experiences. As assumed, negative associations with numinous experiences were less marked than those with religion and spirituality—for both atheism and agnosticism. Above and beyond the hypothesized relationships, humanism showed modest positive correlations with religious belief, spirituality, and numinous experiences. Religious belief and (to a very small degree) religious belonging were negatively related to personal responsibility.

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TABLE 4
Correlations Between Dimensions of Secularity and Discriminant Measures

	<i>Religious Belonging^a</i>	<i>Religious Belief</i>	<i>Spirituality</i>	<i>Numinous Experiences</i>
Atheism	-.70***	-.72***	-.63***	-.27***
Agnosticism ^b	-.34***	-.14**	-.10*	-.06
Scientism	-.16**	-.22***	-.33***	-.24***
Personal responsibility	-.10*	-.14**	-.05	.04
Humanism ^b	.09	.21***	.14**	.13**

^a $N = 299$. ^bTransformed.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (one-sided).

Criterion Validity

Men were expected to report higher values in atheism, agnosticism, and scientism. A multivariate analysis of covariance (controlled for age) was significant, $F(3, 407) = 7.11$, $p < .001$, $\eta^2 = .05$. As assumed, men showed higher scores for atheism ($p = .04$, $\eta^2 = .01$) and scientism ($p = .002$, $\eta^2 = .02$). Contrary to the expectation, women reported higher values in agnosticism ($p = .01$, $\eta^2 = .02$; for descriptive statistics, see Table 5).

Table 6 contains DoS scales' mean values for self-description as religious, spiritual, agnostic, atheist, and indifferent. A multivariate analysis of covariance (controlled for age and sex) was significant, $F(20, 1330.92) = 24.43$, $p < .001$, $\eta^2 = .23$. The effect size was large; group differences were found for atheism, agnosticism, scientism, and humanism. Atheists reported higher scores in atheism than all others; agnostics reported higher scores in atheism than religious and spiritual individuals; spiritual persons reported higher scores in atheism than religious individuals. Agnosticism was higher among agnostics than among all others. Atheists and religionists both exhibited lower agnosticism scores than all other groups. Scientism scores were higher for atheists and agnostics than for religious and spiritual individuals. Humanism scores only differed between religionists (highest values) and the indifferent (lowest values). Personal responsibility was not substantially different for the five groups.

TABLE 5
Dimensions of Secularity Means and Standard Deviations for Women ($N = 281$) and Men ($N = 131$): Levels of Significance and Effect Sizes for Gender Differences

	<i>Women M(SD)</i>	<i>Men M(SD)</i>	<i>p</i>	η^2
Atheism	2.93 (1.45)	3.19 (1.59)	.04	.007
Agnosticism	3.57 (1.24)	3.32 (1.36)	.01	.016
Scientism	2.07 (0.98)	2.40 (1.14)	.002	.024
Personal responsibility	2.87 (0.93)	2.78 (0.92)	.37	.006
Humanism	4.28 (0.63)	4.17 (0.59)	.12	.002

Note. Bold = significant

TABLE 6
 DoS Means and Standard Deviations for Self-Described Atheists ($N = 63$),
 Agnostics ($N = 134$), Indifferent ($N = 27$), Spiritual ($N = 118$), and Religious ($N = 70$):
 Levels of Significance and Effect Sizes for Group Differences

<i>Self-Description</i> → ↓ <i>DoS Scale</i>	<i>Atheist</i> <i>M (SD)</i>	<i>Agnostic</i> <i>M (SD)</i>	<i>Indifferent</i> <i>M (SD)</i>	<i>Spiritual</i> <i>M (SD)</i>	<i>Religious</i> <i>M (SD)</i>	<i>p</i>	η^2
Atheism	4.66 (0.52)	3.66 (0.91)	3.88 (1.06)	2.18 (1.21)	1.34 (1.00)	<.001	.564
Agnosticism	2.91 (1.42)	4.02 (0.90)	3.83 (0.89)	3.42 (1.23)	2.79 (1.47)	<.001	.141
Scientism	2.58 (1.16)	2.37 (1.05)	2.32 (0.99)	1.91 (0.93)	1.98 (0.92)	<.001	.064
Personal responsibility	2.76 (1.04)	2.97 (0.84)	2.88 (0.96)	2.88 (0.87)	2.61 (1.05)	.12	.018
Humanism	4.22 (0.68)	4.18 (0.65)	3.97 (0.68)	4.29 (0.57)	4.40 (0.50)	.02	.030

Note. DoS = Dimensions of Secularity.
 Bold = significant.

Discussion

The purpose of this study was to develop a variety of dimensional measures of beliefs and attitudes that are associated with secular identities. Psychometric properties of the pilot version have been promising with regard to internal consistencies and factor structure. Improvement of item difficulty (humanism) and scale reliability (personal responsibility) is targeted in the revised version (see Study 2).

In exploratory factor analysis, all five scales have been clearly identified. Atheism and agnosticism shared some common variance. This overlap could be accounted for by an understanding of agnosticism as held by T. H. Huxley, who coined the term. On the basis of his agnosticism, Huxley “rejected as outright false—rather than as not known to be true or false—many widely popular views about God, his providence, and man’s posthumous destiny” (“Agnosticism,” 2014). Altogether, factor intercorrelation was too low to warrant secondary factor analysis (as also indicated by the KMO criterion). There does not seem to be a higher order, general “secularity factor” behind the five DoS scales.

Further evidence for validity was shown by correlation patterns with discriminant measures. Religious belonging, religious belief, spirituality, and numinous experiences represent attitudes and beliefs that are typically discriminated from secularity. As had been expected, atheism strongly predicted negative attitudes toward religious belonging and belief, and spirituality. Objection to numinous experiences was much less strong, thus validating the operationalization of atheism as denial of the existence of one or more gods, or the divine (Blackburn, 2008; Gessmann & Schmidt, 2009)—but not necessarily a denial of the possibility that information can be acquired by means external to the basic assumptions of science. This result ties in with recent findings that suggest atheism might well be linked to new age beliefs, such as beliefs in an afterlife, reincarnation, lucky charms, astrology, healers, and so on (Rommel, 2014; Schnell & Keenan, 2013).

However, the relationship between atheism and numinous experiences was negative, and significantly so. As illustrated by the scatter plot (not included here), numinous experiences were rarely reported when atheism was high but more frequently when atheism was moderate.

Agnosticism was understood and operationalized as the view that the metaphysical question of god or higher powers is unanswerable. Hence, the nature of the construct is conceptually different from atheism. Instead of expressing an opinion on the existence of god or higher powers, it conveys a sense of doubt—which does, however, not deny the existence of gods or higher powers per se. This more cautious position was mirrored in the correlation pattern with discriminant measures. Agnosticism showed a moderately negative correlation with religious belonging, and no correlations with religious belief, spirituality, or numinous experiences. This finding is noteworthy, as it suggests that there might be just as many agnostic believers as unbelievers, as many spiritual as nonspiritual agnostics (cf. “Agnosticism,” 2014).

Expected gender differences in atheism and scientism were found (higher scores for men). In contrast to previous findings (e.g., Hunsberger & Altemeyer, 2006; Zuckerman, 2007), agnosticism in the present sample was significantly higher among women than men. This result cannot primarily be attributed to the sample specificity: Looking at the participants’ self-description, more men than women self-described as agnostic (35% vs. 31%), and more men than women self-described as atheist (21% vs. 13%). Dimensional measurement obviously measures something different from self-categorization—as it was intended to do. While the use of categories demands the choice of one option only, dimensional measurement can reproduce individual complexity, such as different degrees of agreement, ambivalence, and so on.

Yet, categories of self-description and DoS scales exhibited a substantial amount of shared variance, as should be expected. Atheists, agnostics, indifferent, religious, and spiritual individuals differed significantly and plausibly with regard to their agreement to the DoS scales. Atheists exhibited the highest scores in atheism and religionists the lowest. Agnostics reported the highest scores in agnosticism, religionists the lowest—followed by atheists. Scientism was highest among atheists and agnostics and lowest among spiritual and religious individuals.

In a second study, the revised DoS was examined and further validated.

STUDY 2: THE DoS REVISED

The aim in Study 2 was to examine the psychometric properties of the revised DoS scales in a random sample taken from the Austrian population. Demographic distribution of DoS scales could thus be investigated. Furthermore, factorial validity and construct validity with regard to sources of meaning were analyzed.

Method

Procedure and Participants

Based on Austrian population statistics for county and community size, a ratio of distribution was calculated. In accordance with this ratio, 2,000 people were randomly selected from a public directory and invited—per (nonelectronic) mail—to participate. The study was carried out online. Although several strategies to increase participation had been employed (personalized letter, incentive upon completion, offer to participate offline), the response rate was very low (7%; for a similar response rate in Austria, see Kautonen, van Gelderen, & Fink, 2013). Although, in

2013, 81% of Austrian households had at least one computer and Internet access (Statistik Austria, 2013), online data collection might still be a reason for low response rates (cf. Lefever, Dal, & Matthiasdottir, 2007), with response rates as low as 2% (Petchenik & Watermolen, 2011).

Nevertheless, distribution of gender, age, and family status was very close to that in the general population. After analyzing data sets of all 137 respondents who fully completed the questionnaire, one multivariate outlier was eliminated. Of the 136 remaining participants, 45% were female. Age ranged from 18 to 83, with a median of 47 (Austria = 42 for the *entire* population). Seventy-three percent were partnered (Austria = 74%), and 62% had one or more children (Austria = 60%). Education was higher in the sample than in the general population: 7% had minimum compulsory schooling (Austria = 24%), 24% had graduated from trade/vocational school (Austria = 15%), 34% from high school (Austria = 15%), and 29% had a university or polytechnic degree (Austria = 12%). Of all participants, 30% self-described as a “religious person,” 19% as a “spiritual person,” 15% as “religious and spiritual,” 24% as “agnostic,” 6% as “atheist,” and 6% as “indifferent.” Ninety-five percent were Austrian, and the remaining 5% were from Germany ($n = 3$), Belgium ($n = 1$), Macedonia ($n = 1$), and New Zealand ($n = 1$).

Measures

Dimensions of secularity. The previously tested pilot version of the DoS was revised as follows: Three items from the humanism scale were substituted by items that aimed at higher item difficulty. To increase internal consistency, one item each was exchanged in the scientism and the personal responsibility scales, and one item was added to the latter scale.

The second version of the DoS thus consists of 23 items. Its five scales measure degrees of atheism, agnosticism, scientism, personal responsibility, and humanism.

Sources of meaning and meaning in life. For the purpose of validation, the Sources of Meaning and Meaning in Life Questionnaire (SoMe; Schnell, 2009b; Schnell & Becker, 2007) was included in the survey. The SoMe is a comprehensive inventory of sources of meaning, derived from qualitative studies that explored in depth the meanings underlying people’s action, thought, and experience (see Schnell, 2009a, 2014). Sources of meaning are defined as “values in action,” motivating commitment to and direction of action in different areas of life (Leontiev, 1982; Schnell, 2009b; Schnell & Becker, 2006, 2007). Sources of meaning scales quantify the degree of realization of each of the 26 orientations. Factor analyses suggest a summary of these by the following five dimensions:

1. Vertical selftranscendence: orientation toward an immaterial, cosmic power.
2. Horizontal selftranscendence: taking responsibility for (worldly) affairs beyond one’s immediate concerns.
3. Selfactualization: employing, challenging, and fostering one’s capacities.
4. Order: holding on to values, practicality, decency, and the tried and tested.
5. Well-being and relatedness: cultivating and enjoying life’s pleasures in privacy and company.

Internal consistencies (Cronbach’s alpha) range from .83 to .93 for the factors ($M = .89$) and from .65 to .95 for the scales ($M = .79$; Schnell & Becker, 2007). Sources of meaning,

Meaningfulness, and Crisis of Meaning show high test–retest reliability; 2-month test–retest stability coefficients average .81 for the scales and .90 for the factors. Stability of sources of meaning is still high after an interval of 6 months (.72 for the scales, .78 for the factors).

Numerous studies have confirmed the questionnaire’s content, construct, factorial, divergent, and incremental validity (e.g., Damásio, Koller, & Schnell, 2013; Lavigne, Hofman, Ring, Ryder, & Woodward, 2013; Pedersen, Birkeland, La Cour, & Schnell, 2013; Schnell, 2010, 2011, 2012, 2014; Schnell & Hoof, 2012; Schnell & Pali, 2013; Silver et al., 2013). It is presently in use in 17 languages.

Hypotheses

People show great variation in the sources of meaning they are committed to (delle Fave, Brdar, Wissen, & Vella-Brodrick, 2013; Schnell, 2011). Sources of meaning that refer to a supernatural reality (vertical selftranscendence) should be of little importance when atheism, agnosticism, and scientism are high. Scientism emphasizes the potential of science and technology to solve problems and improve life. Personal responsibility operationalizes an attitude that sees every person as self-reliant, instead of handing over responsibility to higher powers, or a god. Both latter scales imply autonomy and independence; they are thus assumed to be associated with a commitment to selfactualization, covering sources of meaning like power, development, achievement, creativity, individualism, and freedom. Humanism represents an ethical, value-based approach to life and society; as such, it should be positively correlated with horizontal selftranscendence, that is, active responsibility for (worldly) affairs beyond one’s immediate concerns, covering sources of meaning like social commitment, generativity, and unison with nature.

Results

Descriptive Statistics

Internal reliabilities of the new scales improved and ranged from .75 to .90 (see Table 7). Item difficulty for humanism increased, as had been intended. In the present sample, agnosticism, personal responsibility, and humanism were negatively skewed to a moderate degree, and

TABLE 7
Descriptive Statistics for Dimensions of Secularity Scales, Version 2

<i>Scale</i>	<i>M</i>	<i>SD</i>	<i>Md</i>	<i>No. Items</i>	<i>Cronbach’s α</i>	<i>Skewness^a</i>	<i>Kurtosis</i>
Atheism	1.87	1.52	1.80	5	.90	<i>0.51</i>	−0.85
Agnosticism	3.35	1.42	3.60	5	.87	<i>−0.84</i>	−0.05
Scientism	1.91	1.12	2.00	4	.83	0.41	−0.57
Personal responsibility	3.57	0.96	3.60	5	.88	<i>−0.60</i>	0.52
Humanism	3.52	0.78	3.75	4	.75	<i>−0.56</i>	−0.32

Note. Response range is 0 to 5.

N = 136.

^aValues in italics are moderately skewed; therefore, also Median values (*Md*) are given.

TABLE 8
Dimensions of Secularity Version 2 Intercorrelations and Correlations with Demographic Variables

	<i>Agnosticism</i>	<i>Scientism</i>	<i>Personal Responsibility</i>	<i>Humanism</i>	<i>Sex</i> ^a	<i>Age</i>	<i>Education</i> ^b	<i>Children</i> ^c
Atheism ^a	.18*	.27***	.05	-.08	.08	-.11	.13	-.08
Agnosticism ^d		-.13	.13	.16	.01	.16	.05	.12
Scientism			.16	-.11	-.02	-.06	-.11	-.07
Personal responsibility ^d				.06	-.10	-.14	.02	-.16
Humanism ^d					.07	.11	.12	.05

Note. N = 136.

^a1 = female, 2 = male.

^bSpearman rho.

^c0 = no children, 1 = children.

^dTransformed.

*p ≤ .05. ***p ≤ .001 (two-sided).

atheism positively skewed. For correlational analyses, agnosticism has been log-transformed, and personal responsibility, humanism, and atheism have been square-root-transformed. DoS scale intercorrelation and relationships with demographic parameters are shown in Table 8. DoS scales were largely uncorrelated, apart from modest positive correlations between atheism and scientism, and atheism and agnosticism. DoS scales were also unrelated to age, sex, level of education, and parenthood.

Factorial Validity

Confirmatory factor analysis was performed to test the hypothesized DoS five-factor model (see Fig. 1). Multivariate normality was violated, as indicated by the Mardia test, but skewness and kurtosis were clearly within the limits defined by West, Finch, and Curran (1995; skewness < 2, kurtosis < 7). Therefore, maximum likelihood estimation could be employed for model estimation, complemented by Bollen-Stine bootstrap correction. Table 9 presents goodness-of-fit indicators for independence model, one-factor model, and five-factor model. Bollen-Stine-corrected chi-square was nonsignificant for the five-factor model; it is not refuted. Its normed chi-square was below the cutoff of 2.0 (Ullman, 2001); also comparative fit index,

TABLE 9
Goodness-of-Fit Indices for Independence, One-Factor, and Five-Factor Models

<i>Model</i>	χ^2	<i>df</i>	χ^2/df	<i>p</i> ^a	<i>CFI</i>	<i>TLI</i>	<i>RMSEA</i>
Independence	1829.33	253	7.23		.00	.00	.22
One-factor	1157.40	225	5.14	.001	.41	.34	.18
Five-factor	308.55	219	1.41	.138	.94	.93	.055

Note. CFI = comparative fit index, TLI = Tucker-Lewis index, RMSEA = root mean square error of approximation.

^aBollen-Stine bootstrap corrected.

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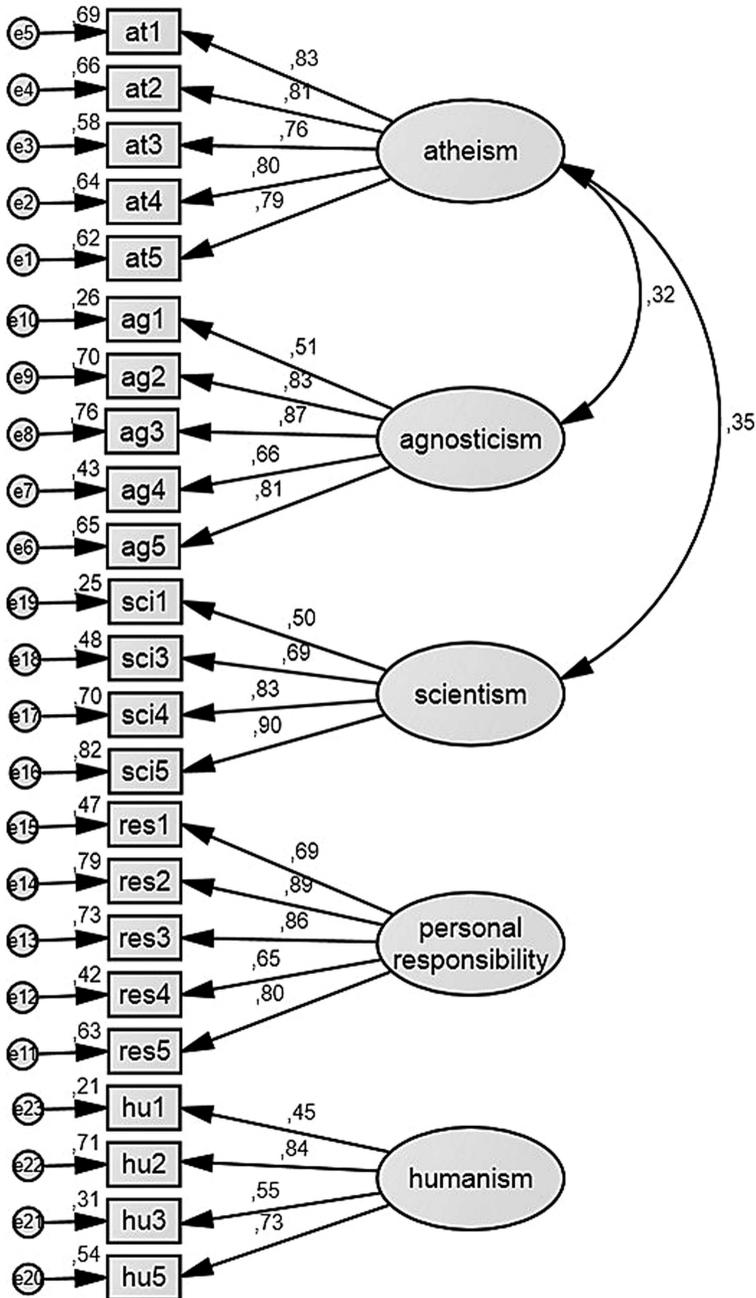


FIGURE 1 Confirmatory factor analysis (maximum likelihood estimation) for five-factor model (standardized estimates).

TABLE 10
Correlations Between Dimensions of Secularity (vs. 2) and Dimensions of Sources of Meaning

	<i>Vertical Selftranscendence</i>	<i>Horizontal Selftranscendence</i>	<i>Self- actualization</i>	<i>Order</i>	<i>Well-Being and Relatedness</i>
Atheism ^a	-.66***	-.17*	.06	-.02	-.14
Agnosticism ^a	-.25**	.09	.01	.11	.04
Scientism	-.11	-.03	.20*	.34***	.07
Personal responsibility ^a	-.14	-.04	.05	.19*	.13
Humanism ^a	-.09	.36***	.11	.08	.17*

^aTransformed.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Tucker-Lewis index, and root mean square error of approximation values indicated acceptable model fit (Hu & Bentler, 1999).

Construct Validity: Associations with Sources of Meaning

Relationships between the DoS dimensions and SoMe dimensions are presented in Table 10. Vertical selftranscendence exhibited negative correlations with atheism and agnosticism, but not scientism. The latter showed a modest positive relationship with selfactualization, as expected, but personal responsibility did not. In line with the hypothesis, humanism was positively related to horizontal selftranscendence. Moreover, scientism and personal responsibility exhibited positive associations with order.

Discussion

The second, revised version of the DoS proved to be highly reliable (internal consistencies from .75 to .90) while also being economical (23 items). All DoS scales were unrelated to demographic variables. In contrast to Study 1, no gender effect was found for atheism, agnosticism, or scientism. However, in Study 1, atheism was only slightly higher among men than among women ($\eta^2 = .007$), which was similar, but not significant, in Study 2 ($\eta^2 = .006$). Gender differences in agnosticism and scientism, as have been found in Study 1, might well be a particularity among highly educated men and women.

In Study 2, people with a large variety of educational levels participated. No significant correlation between education and DoS scales was established. This seems to contradict several findings in the literature, such that religious belief decreases with educational attainment, and agnosticism is (positively) predicted by educational attainment (Sherkat, 2008). Keysar (2007) noted that agnostics have the highest educational attainment—far higher than atheists or “nones.” Nonreligion has also been found to be prominent among eminent scientists (e.g., Dawkins, 2006; Ecklund & Scheitle, 2007; Larson & Witham, 1998). Most of these findings focus on what Lynn, Harvey, and Nyborg (2009) called “intelligence elites”—individuals who at least have a PhD and are successful scholars or scientists. Although it might well be that, on a very high level of intellectual reflection, atheism and/or agnosticism are more frequent than in the general population, this does not necessarily imply a linear relationship

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between education and atheism or agnosticism. Some support for this interpretation comes from the fact that atheism was much higher in the academic sample from Study 1 ($M = 3.01$, $SD = 1.50$) than in the population sample from Study 2 ($M = 1.87$, $SD = 1.52$), $t(546) = 7.66$, $p < .001$, Cohen's $d = 0.76$). However, there was no such sample difference for agnosticism.

A recent meta-analysis by Zuckerman, Silberman, and Hall (2013) has reviewed available studies on intelligence, education, and religiosity. They found a very small (if not negligible) average correlation between religiosity and education of $r = -.06$, which is even lower than the correlation coefficients for relationships between education and atheism/scientism in Study 2 (see Table 8). In line with Kanazawa (2010), Zuckerman and colleagues (2013) assumed that the relation between education and religiosity can be accounted for by intelligence, which might also explain the findings on "intelligence elites" just reported.

Study 2 confirmed the five-factor structure of the revised DoS scales. The five-factor model exhibited much better goodness-of-fit than a one-factor model. Low factor intercorrelation did not suggest superordinate factors.

Hypotheses regarding relationships between DoS scales and dimensions of sources of meaning were largely supported. Atheism and agnosticism correlated negatively with vertical self-transcendence, indicating that neither belief in a personal god nor belief in a higher power are relevant sources of meaning when atheism or agnosticism are high. Scientism was positively related to selfactualization, supporting the assumption that trust in science is associated with trust in personal capacities. Also humanism and horizontal selftranscendence showed the expected positive relationship. A value-oriented humanist stance thus comes with a propensity to take responsibility for matters beyond one's immediate concern.

Contrary to the hypothesis, scientism was not negatively related to vertical selftranscendence. Therefore, trust in science does not necessarily contradict trust in god or a higher power. Interestingly, scientism was positively correlated with order, that is, commitment to tradition, practicality, morality, and reason. Trust in science thus appears to be a characteristic of people with conservative, down-to-earth commitments. The lack of an association between personal responsibility and selfactualization suggests that an awareness of self-responsibility does not entail a commitment to employ and develop one's capacities. It might as well be experienced as an overcharging burden. The positive association between personal responsibility and order seems to substantiate this guess, in that the reliance on structure and order appears to increase with the awareness of self-responsibility.

GENERAL DISCUSSION

The purpose of both studies was to develop and test a variety of dimensional measures of beliefs and attitudes that might characterize secular identities. In contrast to religious, spiritual, or supernatural beliefs, very little is known today about secular beliefs apart from those rejecting or qualifying religious or supernatural beliefs (atheism and agnosticism). Moreover, atheism and agnosticism have, to date, been used only as categorical constructs. Individuals were classified either as atheist or not atheist, agnostic or not agnostic. A dimensional conceptualization of both comes much closer to the psychological understanding of attitudes and beliefs as continua. As indicated by both studies' results, people can be more or less convinced about the nonexistence

of god, or the impossibility to answer the metaphysical question of god. Dimensional assessment thus gives the opportunity to gain insights into the complexity of secular identities and to relate them to further constructs of interest.

The DoS offers an economical approach to this kind of exploration. Psychometric properties have been improved in a two-step developmental process. In the second version of the DoS, Cronbach alphas were good, and the five-factor structure has been confirmed. Scale intercorrelations showed that DoS scales are only moderately related, indicating that it is impossible to talk about *the* secular identity. The dimensional approach is thus justified, allowing for a variety of combinations of secular attitudes and beliefs.

The DoS has been designed as an open inventory. Because secularity is mostly negatively defined (“attitudes or beliefs that have no religious or spiritual basis;” “Secular,” 2014), and there is no agreement on a specific set of attitudes and beliefs pertaining to secularity, the DoS is not supposed to be complete, or comprehensive. Therefore, researchers are invited to add and empirically test potential dimensions of secular identities.

Further validation is necessary. Construct validation should cover relationships with different levels of personality, from traits to cognitive styles, values, and so on. To test for criterion-related validity, secular organizations (such as humanists, freethinkers, brights, etc.) could be compared with regard to their DoS scores. Stability is also of high concern. When, and how, does secularity develop, and how does it change over the course of a lifetime? Do different dimensions show dissimilar stabilities?

For clinical use, several applications suggest themselves. Although a lot of work has gone into ways of drawing on religion or spirituality as resources in therapy and counseling, and attention to religious and spiritual beliefs has been incorporated into the ACA Code of Ethics (American Counseling Association, 2005; see D’Andrea & Sprenger, 2007), psychologists are often at a loss when it comes to constructive recognition of *secular* attitudes and beliefs. Employment of the DoS offers insights into beliefs and orientations that are associated with secularity. Awareness of these—mostly implicit—cognitive schemata can enhance self-knowledge and inform the therapeutic process.

The DoS is currently available in German; an English version is in process. Because DoS scales measure secularity from different perspectives, it is not necessary to employ the whole inventory at all times. Single scales can be selected and employed, depending on the subject of study.

ORCID

Tatjana Schnell  <http://orcid.org/0000-0002-7991-2242>

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